current place corresponding to internal music time (playing place). Bold horizontal lines in (B), (C), (D), (E), (F), (G), and (H) show border lines between old page and new page. This example includes setting by both Claim2 and Claim 10.

By taking this way, the accuracy of system's following up performance may not be precise. With this way, even system's timing is late when performance reaches at the end of page, top of the next page is shown sufficiently before that timing, because the renewing place is at enough distance forward from the playing place. This previous showing of top of the next page gives the player chance of glimpse of next music, during he is playing at the last stems. It keeps player from surprise at the top of new page. Also, it allows player to prepare; sitting posture or angle of instruments. Also, even system's timing is ahead of performing and go into the top of next page but performance is still near bottom of the old page, enough portion of bottom of old page is still remains there, because renewing place is at enough distance backward from the playing place. All these are possible by electronic display and this invention.

To make Claim 2 clearer, it is revised by inserting commentary phrases "named renewing partition" and "named playing partition".

I think, by this revision and above explanation, questions about claim 2 (ITEM 2 in office action) is resolved.

Regarding Claim 10:

(1) If one half page is set as the distance written in Claim 2, to set up performing place for certain renewing partition, one half page forward from performance place, and one half page backward from performance place come to the same point. Therefore there is no allowance of selecting playing partition. And, there is renewing place always. So, display screen always contains old and new pages, except at the timing when playing place is at the center of page and whole current one page is displayed.

If one third of page is set as minimum distance in both directions, there is one third page room of choice. If one quarter of page is set as minimum distance, there is one half room of choice. It seems one third of page as distance between renewing and playing partition is enough to resolve the trouble at the very end of page and at the very top of page. Here comes designing choice.

Design here is equal to set up function expressed by, for example, graphs in the Fig. 5. To each of renewing partition, one position of playing place should be given. Both input and output value of the function means position in the one page. When playing point comes to the output value, Partition located at input value is renewed.

Claim 10 stands on some deep psychology. Well studied conductor or well exercised player memorized every page of music composition as whole image. There seems to be peace of mind in looking whole page of music. Design principle in the way described in Claim 10 is that setting the playing partition should be designed so that time length of whole page display becomes as long as possible. But, it must be balanced with requirement of keeping certain distance between playing and renewing partitions.

Pick up Fig. 5 (C) as example for explain what will happen by setting this function. Until playing place reaches 4/5 of full page (1/5 from the bottom), no portion of upper half page is not renewed, whole display stays on current page. During playing place moves from 4/5 to end of page, all upper half page is renewed. And then playing place go to the top. And during playing place move from top to 1/5, all lower half page is

renewed. As a result, during playing place move from 1/5 to 4/5, there is no change and whole page is displayed.
(2) Reference to fig. 5 is removed.
(3) For understanding of Claim 10, explanatory closes describing the result from claim limitation are added. Also, commentary words "playing" are added.

ITEM 3.
Regarding Claim 1
Wording "such as" is replaced by "including but not limited to".

REPLY TO CLAIM REJECTIONS – 35 USC 102
ITEM 5.

Regarding Claim 1.
(1) Claim 1 defines the "second data memory" as "which holds detailed tempo data representing duration time of every beats or its subdivision, called tick or clock, along all through said music piece".

Especially it says "every beats". This means if in simple case a music composition has 100 bars in 4/4 measure, the second data memory holds 400 numeric data of duration time. Actually, operas composed in 20th century, have frequent tempo changes written or not written on printed scores. Any single or several "tempo" data does not work for automatic following up of music performance. On the other hand, data of "every bats" "along all through said music piece" work for versatile compositions.

I can not find any description about memorized "every beats" in the Sitrick's description.

Sitrick discloses a few ways for input the timing of turning page by user's direct operation. He also discloses various way of following up the conductor's movements (Column 50 line 36 ~ Column 52 line 2). By utilizing these technologies, it may possible to follow up the performance of music. But, it is not "autonomous". It is input from external phenomena. So, there is not disclosed "second data memory" in this invention.
(2) Claim 1 defines "first function" as "which autonomously advances internal music time by reading out consecutive duration time from the second data memory and measuring the duration time". As explained in above paragraphs in (1), Sitrick does not teach technique relating this first function.
(3) Sitrick discloses items seems relating to second function in Claim 1. He calls partition as "slice".
(4) Third function of Claim 1 is for renewal of display from old to new contents. It is different with Sitrick's.

In Sitrick's, even there are several mode of "Immediate, Step and Reveal", there are no control of individual partitions relating individually set playing places. When turning page, all slices of whole page (half page in Step mode) are renewed in fast(Immediate) or slow (Reveal) speed.

In Claim 1, as explained in above ITEM 2. Regarding Claim 2, each partition has its own preset value of renewing timing as timing of playing place, corresponding internal music time of the first function, reaches certain note or rest in the partition at certain distance.
(5) Description about "Sitrick's adjusting" is found at column 8 line 5. Here adjusting seems done in the manner of batch processing, it is not adjusting in real time mode;

Musician plays some part of composition, the workstation analyses its sound, then adjust key, pitch and tempo of the composition.

Strick's analysis of conductor's movement can be used to follow up the music performance. But there is no internal music timing.

Only the first data memory and the second function are seen in Sitrick's. Other memory and functions are different. So, Claim 1 define new structure of memories and functions. And by these new structure and functions, high grade of perfection at the display transition from old to new page is realized.

Regarding Claim 7:

Sitrick disclose the use of master-slave arrangement. But page turn positions in the composition are same at the two substations. If page turn positions are different in two subsystems, they operate in "independent" mode.

In orchestra, pagination, that is division of whole composition into pages, are different between instruments. Music score for first violin has different pagination with cello's, flute's, trumpet's. But, all music have same number of total bars and beats, and they are all synchronized when performed.

Claim 7 define the compound system, where master system generates music time (bar number and beat umber) and deliver it to all other slave systems. Display transition to new pages in the all slave systems are automatically executed, even they have different paginations. This is enabled by the base structure defined in Claim 1 and Claim 7.

Regarding Claim 8:

Sitrick discloses use of touch panel input. In Fig. 17, it is used for selection of function such as "go forward a page" or "go back a page". It is not used to pointing a note in music display and to transform it into the music time. He also discloses that touching left side portion of music display is recognized as turn a page back. These are not transform from pointed note in display into music time.

Claim 8 define seventh function, which transform (i) page and position in display to music time and (ii) music time to page and position in display. Transformation is available in both directions (i) and (ii).

Claim 8 further define the communication to share the same place in music. The route of delivery is as follows: Initiating user (conductor or a player) pointing on the display – transformed into music time – delivered to all subsystems – transformed in to page and position on the display at each subsystem.

REPLY TO CLAIM REJECTIONS – 35 USC 103
ITEM 7.

Regarding Claim 2:

Grubb discloses some diversion technique (col.9 lines 30-40) to find most matched window position. This is pattern recognition technique to find location in the score and then follow up the performance using sound input.

As explained before in ITEM 2, Regarding Claim 2, Claim 2 defines the technique for smooth page transition in display. Distances in both forward and backward

direction are set as a rule. To decide music time of playing partition, the method use one valued function as shown in fig. 5. It is not necessary to use diversion technique.

Therefore, Grubb does not teach or suggest contents of Claim2.

Regarding Claim 3:

Grubb discloses three information as a source of procedure at Col. 5, lines 39-56. But, these three are not alternative candidate of location output. First, "performer's location at the time of the previous observation" is obviously old and behind the current location. Second, "observation most recently extracted" is data extracted from sound such as pitch or formant and is not location value. So, it can't be used as candidate location. Third, "estimated distance" is only usable as candidate of current location data. Anyway, Grubb does not intend to use one of three information directly as output. These three information are taken into mathematical procedure to get "score position density function" and then the most likely position as a result.

In an embodiment of this application shown in Fig. 8, there are four level timing input: (i) detection from performing sound, (ii) detection from conductor's beat movement, (iii) direct input from button, (iv) external timing input. For a basic internal music time, there is internal timer measuring consecutive duration time from the second memory. Level (i) input is option. And it does not give all beats even when installed, because it can't detect beat during silent or long tone. Also, it is not reliable or robust with current technology. Level (ii) input is also option. And sometimes conductor does not give all beats, especially for top class orchestra. Level (iii) is standard equipment, but its input is occasionally, case by case. Level (iv) is essential when the subsystem is used in slave mode.

Therefore, except in slave mode, inputs from these three levels do not come in constantly, but, if input comes in, it is more reliable than internal timing or lower level input. Things are complicated because these inputs are not synchronized, but come in the vicinity in unknown sequence, or some or all do not come in. The fourth function must deal with these complicated and indeterminate events.

Wording of Claim 3 comes from here. I add one comma for easy parsing.

Claim 3 define multiple input other than internal timing (multiple on 1). Grubb's method may be interpreted extensively as generating one timing input (as final output of procedure) other than internal timing (estimated distance). But it is not multiple input even in this interpretation (1 on 1).

Regarding Claim 4:

As far as it is for music display and page transition, it is not necessary to follow up performance with rigid preciseness. With technique of Claim 2, there is wide allowance. It is expected that system's following up performance becomes fairly good in the next time performance using contents in the second data memory revised in the first performance. In the second time using only (iv) direct input, above mentioned, it works to correct internal timing only when difference becomes big. The correction input may be once in ten bars or more. Therefore Claim 4 define modification takes place only "when correction happened". This means modification is done occasionally in macroscopic view. This avoids effect of timing deviation error in single correction input.

On the other hand, in Grubb's method typically shown in Fig.2, tempo adjustment is executed every time (in boxes 34 and 36). This means it is adaptive but microscopic.

Therefore Claim 4 has new idea and has its effect.

Regarding Claim 5 and 6:

Memorizing every duration of beats is new idea. And it works very well to mapping music performance into digital data, compare with just tempo specifications as written in printed music, because there are (i) gradual tempo change such as *accelerando* or *ritardando*, (ii) transition between different tempo, and (iii) possible local expanded duration not written in printed music. There is no way using sound data as internal timing with current art.

Also, by using memorized modified duration times, it is expected that far less correction is enough for the next time performance. So, it is possible to use system without correction tools using sound input or video input, which require big computing power. Just direct input devices like mouse or foot pedal works for correction of timing.

Regarding Claim 9:

This claim stands on the same reason with description at above **Regarding Claim 5 and 6**. Also, this provides the way many public performers start with data on the media uploading to the second data memory of the system. It is expected to follow up performance fairly well.

Regarding Claim 10:

I think I already explain meaning of Claim 10 at **ITEM 2 Regarding Claim 2** and **Regarding Claim 10**. Claim 2 provides enough portion of music for preview and looking back. It eliminate anxiety of miss matched timing by old fashion turning page machine at the end of page.

Claim 10 provides the way to expand period of whole page display to satisfy deep psychological desire to look whole image of page. So, Claim2 and Claim 10 have contradictory purpose. But, with basic structure given by Claim 1, it is possible to get well balanced setting by designing function as shown in Fig.5.

CONCLUSION

I tried to explain the differences between this invention and sited references as much as I can. Your reconsideration is greatly appreciated.

Attachments

Revised Claims: with display of revised places.
Revised Claims: without display of revised places.
FIG. A: For explanation; one sheet

January 4th, 2008
Inventor and Applicant
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Claims

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1. System for displaying music score in electronic display device, including:

first data memory, which holds base data to be transformed into images of music score of a music piece, and

second data memory, which holds detailed tempo data representing duration time of every beats or its subdivision, called tick or clock, along all through said music piece,

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also having:

first function, which autonomously advances internal music time by reading out consecutive duration time from the second data memory and measuring the duration time, wherein music time means an expression specifying playing position in the music piece including but not limited to 3-tuple number of measure, beat and tick or clock,

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second function, which sets up partition of display space and generates image for each partition of each page using data in the first data memory,

third function, which renews display image at a partition of the second function when the internal music time of the first function reaches value preset for each partition,

and fourth function, which corrects difference between internal music time and actual performing music time by using timing input derived from performance.

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2. The system as claimed in claim 1, wherein at the third function the music time value for renewal of the partition, named renewing partition, is preset to the music time corresponding to note or rest displayed at position inside a partition, named playing partition, apart with enough distance in both forward and backward direction from the renewing partition,

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3. The system as claimed in claim 1, wherein the fourth function has multi level timing input regarding reliability, and correction by lower level input can be further corrected by higher level input.

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4. The system as claimed in claim 1, wherein further has: fifth function, which calculates ratio of physical time period from previous correction to current correction against physical time period from previous correction to physical time of internal music time of corrected point, then modifies duration times thereafter in the second data memory by multiplied by the ratio, when correction happened.

5. The system as claimed in claim 1, wherein further has: sixth function, which records and stores modified duration times reflects the correction by the fourth function, and later the system can use said recorded and stored data as data of the second data memory.

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6. The system as claimed in claim 5, wherein user can select options of the sixth function from recording by overwrite in the second data memory, recording to other memory, and non-recording.

7. Compound system comprising plural systems claimed in claim 1 and displaying mixture of same or different music scores, wherein a master system has the second data memory and the first function and the other slave systems display each music score with the first data memory, the second function and the third function in each system, the master system delivers its internal music time to all other slave systems.

8. Compound system comprising plural systems claimed in claim 1 and displaying mixture of same or different music scores, wherein each system has: seventh function, which transforms between music time and page and position in display in both directions, and when a user points on position in music score in an initiating system, the system gets music time from the position by the seventh function and transmits the music time to other systems, the other systems obtain page and position in display at the system from the music time by the seventh function and displays the music score at obtained page and a pointer at the obtained position as the same position the user points at the initiating system.

9. Computer readable media including duration time data in the second data memory corresponding to a music piece, said duration time data is made by or made and duplicated later by the system claimed in claim 5.

10. The system as claimed in claim 1, wherein setting of the music time for renewal in the function 3 is in such way that

music time for renewal of partition in upper half of display is selected from music time corresponding to note or rest in playing partitions lower enough from the center of display field, so that upper half of page display changes during playing point is located from said lower enough partition to the end of page,

and music time for renewal of partition in lower half of display is selected from music time corresponding to note or rest in playing partitions upper enough from the center of display field, so that lower half of page display changes during playing point is located from the top of page to said upper enough partition,

as a result, there is enough time period of displaying whole page; during playing point is located from said upper enough partition to said lower enough partition.

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